

201347 (hereinafter as JP '347). This rejection is respectfully traversed.

Applicant respectfully submits that JP '347 does not disclose or suggest at least a chip type light emitting device comprising, a board of nearly rectangular shape in a plane view, first and second electrode patterns formed at both ends in a longitudinal direction of a surface of the board, each of the electrode patterns being formed through an entire width of the board, a light emitting diode (LED) chip mounted on the first electrode pattern, a metal wire connected to said LED chip and the second electrode pattern by wire bonding, and a translucent resin mold which seals the LED chip and the metal wire. Wherein one notch is formed at one end of said board at the first electrode pattern side and two notches are formed at both sides of the other end of the board at the second electrode pattern side, and the positions at both ends of the translucent resin mold are arranged to the positions at both ends in a longitudinal direction of the board, as recited in Applicant's independent claim 1.

As discussed in the Applicant's specification, the claimed invention discloses a specific structure for securing the wire bonding space as well as leading through the electrode to the rear surface of the substrate so that the characteristics of the distribution of luminous intensity are improved in an extremely small-sized chip type light emitting device.

When the length of a chip becomes, for example, 1.6 mm or less, in order to die-bond a chip, for example, 0.25 to 0.26 mm square, to the center section and wire-bond the upper electrode of the LED chip, a through-hole must be formed at the end of the substrate. If the through-hole is formed at the center of the edge of the end of the substrate, die-bonding must be carried out on the electrode pattern provided directly

above the through-hole, and because there is no base below due to the through-hole, the strength of wire-bonding is weak, thereby creating a problem of extremely poor reliability. See Applicants' Fig. 4, for example.

The present invention addresses the above difficulty in that the reliability of wire-bonding is improved by forming through-holes (notched section) at approximately the corners of the substrate so that the wire bonding point on the substrate is not above a through hole. Additionally, because the through hole is not centered at the edge of the substrate, the LED can be centered on the substrate for better light distribution.

In contrast, JP '347 discloses leadless chip electronic part that essentially suffers from the same deficiencies of Applicants' prior art of Fig. 4. JP '347's chip element is offset from the center of the substrate 27 due to the spacing required between the chip element 22 and the front electrode 13 to accommodate the wire bond 23.

In addition, in Fig. 12, a 6-terminal integrated circuit chip is disclosed, and an example in which an electrode pattern is formed at the corners of the substrate end edges is shown. However, the structure can not provide the same scale of reduction of size as in Applicants' invention since there is insufficient space for forming electrode patterns, as the electrode patterns provided at the corners are independent and separate electrode patterns. In addition, bonding is carried out at the electrode pattern section that extends to the center side, and it is apparently different from the structure of the present invention in which notches are provided on both ends in the width direction by the electrode pattern formed over the whole width of the substrate end section.

In view of the above, it is readily apparent that JP '347 does not disclose or suggest all the features recited in Applicant's claimed invention. Claims 2, 4 and 5 depend from claim 1. Accordingly, for at least the above reasons, Applicant respectfully requests the withdrawal of the rejection of claims 1, 2, 4 and 5 under 35 U.S.C. § 103(b).

The Office Action rejects claims 1, 2 and 4 under 35 U.S.C. §102(b) over JP 59-9564 (hereinafter as JP '564). This rejection is respectfully traversed.

JP '564 discloses a forward/reverse rotation detector for a rotary shaft. The rotary shaft includes a high accuracy detector, using a pick-up groove arrangement.

It is readily apparent that JP '564 does not disclose any feature or attribute that is related to the present invention. Therefore, JP '564 does not disclose or suggest all of the features recited in Applicant's claimed invention. Claims 2 and 4 depend from claim 1.

Therefore, for at least the above reasons, Applicant respectfully requests the withdrawal of the rejection of claims 1, 2 and 4 under 35 U.S.C. § 102(b) over JP '564.

The Office Action rejects claim 3 under 35 U.S.C. § 103(a) over JP '564 or JP '347, in view of Okazaki (U.S. Patent No. 5,814,837). This rejection is respectfully traversed.

Okazaki discloses a compact light-emitting device, wherein an LED 14 is disposed over a substrate 17 with electrode patterns 12 installed on the surface of the substrate 17. Conductive paste 13 is applied to the electrode patterns 12 and the LED 14 to form a bond. Okazaki's approach to the prior art problem is to completely eliminate the wire bond and utilize a conductive paste for direct connection of the LED

to the electrode patterns. Therefore, though Okazaki discloses a board size of less than 1.6 mm x 0.8 mm, one of ordinary skill would not modify Okazaki to have a wire bond, since Okazaki teaches against this. Further, one would not be able to modify the JP '564 or JP '347 to have the board sizes of Okazaki without eliminating the wire bond. Therefore, even if combined, the resulting construction would not disclose or suggest at least the wire bond feature claimed in Applicant's invention. Further, there is no discussion or teaching in either JP '564 or JP '347, or Okazaki relating to forming one notch at one end and two notches on the other end, as in Applicant's independent claim 1.

Therefore, it is readily apparent that Okazaki teaches away from the asserting combination and even if combined, Okazaki does not supply the subject matter lacking in the applied base references. Accordingly, Applicant respectfully submits that JP '564 or JP '347 and Okazaki, individually or in combination, do not disclose or render obvious the subject matter recited in Applicant's independent claim 1.

Claim 3 depends from claim 1. Accordingly, for at least the above reasons, Applicant respectfully requests the withdrawal of the rejection of claim 3 under 35 U.S.C. §103(a).

The Office Action rejects claims 1, 2, 4 and 5 under 35 U.S.C. §103(a) over Figs. 3 or 4 of the Applicant's acknowledged prior art (APA) in view of JP 49-48267. This rejection is respectfully traversed.

JP '267 discloses a structure for easy manufacturing and mounting of small electronic devices (about 1 mm x 2 mm square), particularly, hybrid integrated circuits. And as shown in JP '267's Fig. 2, there is disclosed a structure in which an electronic

device is bonded to the metallized layer 2a at the top of the substrate 1a that corresponds to the groove of the U-shaped type insulating substrate. Two other electrodes are connected to the metallized layers 2b and 2c via a metal thin wire 5 and electrically connected to the metallized layers 2e and 2f (these are installed by being insulated from the metallized layer 2d) which are mounted on the other main surface (rear surface of the substrate) of the insulating substrate 1a via the metallized layers 3b, 3a or 3c, 3'a of the external surface of the substrates 1b, 1c and 1a. Though JP '267 discloses a structure in which wire-bonding is carried out at the top surface of the substrate and an electrode is provided on the rear surface of the substrate in contact with the rear surface, the connection to the rear surface is carried out by the use of the whole substrate side surface. Therefore, it can not be used to connect to the rear electrode via the notched section, since it is not the structure to form notch sections on both sides of the end.

Accordingly, it is readily apparent, that JP '267 does not supply the subject matter lacking in view of the APA. Thus, Applicant respectfully submits that the APA and JP '267, individually or in combination, do not disclose or render obvious Applicant's claimed invention.

Claims 2, 4 and 5 depend from claim 1. Therefore, for at least the above reasons, Applicant respectfully requests the withdrawal of the rejection of claims 1, 2, 4 and 5 under 35 U.S.C. § 103(a).

The Office Action rejects claim 3 under 35 U.S.C. § 103(a) over Figs. 3 or 4 of the APA and JP '267, and in view of Okazaki. This rejection is respectfully traversed.

For the same reason discussed above, Applicant respectfully submits that APA, JP '267 and Okazaki, individually or in combination, do not disclose or suggest the subject matter recited in Applicant's independent claim 1. Claim 3 depends from claim 1. Therefore, for at least the above reasons, Applicant respectfully requests the withdrawal of the rejection of claim 3 under 35 U.S.C. § 103(a).

CONCLUSION

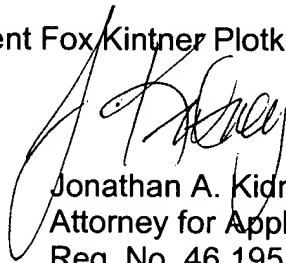
In view of the above remarks, Applicant respectfully submits that this application is in condition for allowance. Favorable consideration and prompt allowance is earnestly solicited. Should the Examiner believe anything further is desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicant's undersigned attorney at the telephone number listed below.

In the event this paper is not considered to be timely filed, Applicant respectfully petitions for an appropriate extension of time. The Commissioner is authorized to charge

payment for any additional fees which may be required with respect to this paper to
Counsel's Deposit Account 01-2300, referring to client-matter number 107400-00017.

Respectfully submitted,

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Enclosures: Marked-Up Copy of Amended Claims
Request for Approval of Drawing Corrections
Petition for Extension of Time (one month)
Notification of Change of Name and Address

MARKED-UP COPY OF AMENDED CLAIMS

1. (Once Amended) A chip type light emitting device comprising:
 - a board of nearly rectangular shape in a plane view;
 - first and second electrode patterns formed at both ends in a longitudinal direction
 - of a surface of said board, each of said electrode patterns being formed through an entire width of said board;
 - a light emitting diode (LED) chip mounted on said first electrode pattern;
 - a metal wire connected to said LED chip and said second electrode pattern by wire bonding; and
 - a translucent resin mold which seals said LED chip and said metal wire;
 - wherein one notch is formed at one end of said board at said first electrode pattern side and two notches are formed at both sides of the other end of said board at said second electrode pattern side, and the positions at both ends of said translucent resin mold are arranged to the positions at both ends in a longitudinal direction of said board.
4. (Once Amended) The chip type light emitting device of claim 1, wherein said metal wire is connected to said LED chip and the surface of said second electrode pattern, which is located on a portion of said board between said two notches formed at both sides of the other end of said board at said second electrode pattern side, by wire bonding.